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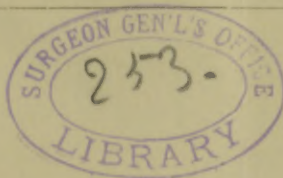
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## Report of the Section on Ophthalmology, Otology and Laryngology.

### PERSONAL OBSERVATIONS OF THE VALUE OF COCAINE IN NOSE AND THROAT SURGERY.

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Laryngology asserts its claims of priority in the use of the *hydrochlorate of cocaine* as a local anæsthetic. It had been employed for years by foreign laryngologists, especially by Fauvel, of Paris, in the form of fluid extract of coca, and by Mackenzie and Lennox Brown, of London, the wine of coca in cases of hyperæmia and irritable conditions of the pharynx and larynx. Koller states that he was led to experiment with it on the eye from his knowledge of the control it had over the sensibility of the mucous membrane of the mouth, pharynx and larynx. The isolation of this alkaloid of the plant *Erythroxyton coca* was first made by a German chemist, Dr. F. Gardeke, who named it *erythroxyline*. The credit of discovering its benumbing and paralysing influence on the tongue is due to an American, Dr. S. R. Percy, who isolated the alkaloid and named it *Erythroxyline*. His paper was read before the New York Academy of Medicine in November, 1857. Unfortunately, Dr. Percy did not give sufficient publicity to his discovery nor did he follow up by experiments the results he had obtained. In 1859, two years afterwards, Nieman published the results of his thorough chemical analysis of cocaine.

In 1862, Prof. Schroff, of Vienna observed its remarkable local anæsthetic properties when applied to the tip of the tongue. It was further known that cocaine through its effects upon the vaso-motor-nerves contracted the peripheral arteries. Such being the facts in regard to the effects of this substance, it is indeed remarkable that the profession generally in Europe and America should never have



availed themselves, except to a very limited extent, of so valuable a therapeutical agent, until Dr. Karl Koller read his paper before the Medical Society of Vienna in September, 1884.

The enthusiasm of the profession in this country was roused to a high pitch by a letter from Dr. Noyes of New York, published in New York, (*Medical Record*, Oct. 11th, 1884) in which he spoke of the extraordinary anæsthetic power of this drug upon the cornea and conjunctiva.

In common with many others the writer had been longing for some local anæsthetic to facilitate operations upon the larynx, naso-pharynx, and the nose, ever since Czermak published his work on the use of the laryngoscope, in 1858. He had tried ether and rhigolene by spray, the bromides, ice, and had run a great risk by using morphia locally as Schrotter had recommended, but all to no avail. He had become resigned to the conclusion that frequent manipulations were the only efficient method of lessening laryngeal sensibility. After reading Dr. Noyes' letter he obtained the rare alkaloid and he has had it in daily and constant use for seven months. He has employed it in a large number of operations of greater or less importance on the nose, the naso-pharynx, the omo-pharynx and on the larynx. He has watched and carefully studied the local effects of the cocaine, and he hopes the Faculty will not consider him egotistical if he submits to them candidly and, as briefly as possible, the results of his personal observations of its value.

Before speaking of its most prominent effects in producing local anæsthesia, he wishes to speak of its influence upon the capillaries and blood vessels of the mucous surfaces, and especially upon the erectile tissue over the turbinated bones of the nose. Its action in his hands proved it to be powerfully astringent, and he noticed that soon after applying it, it contracted the soft tissues on their bones and literally bleaches them. Dr. Bosworth, of New York, explains the effect upon the venous sinuses and the blood vessels as the consequence of its action in producing rigid contraction of unstripped muscular fibres wherever it comes in contact with them. In this way we can understand how it completely empties the large veins of the nose, while it only diminishes the calibre of the capillaries and small blood vessels, for in the intra-venous spaces of the nasal mucous membrane are found large bundles of unstripped muscular fibre, which in contracting enlarge the field of vision, not only on the periphery of the sinuses, but also on the membrane itself, draw-

ing it down upon the turbinated bones—on the other hand, the contraction of the muscular fibres in the coats of the capillaries and blood vessels, no matter how rigid, only seem to diminish their calibre without obliterating them, as is really the case with the erectile bodies (Bosworth). We avail ourselves constantly of this effect by introducing the cocaine over the anterior surface of the nasal cavities in searching for polypi, and in examining the surfaces in all directions. In this way cocaine becomes a great aid in the diagnosis of nasal conditions—it opens up a darkened chamber.

We have recently employed it in the nose of an opera singer, where the hypertrophied texture over the inferior turbinated demanded removal and yet she could not run the risk during her engagements of being inconvenienced by the soreness and temporary swelling which sometimes supervenes after the operation. Two hours before the opera began we bathed the surfaces with a 4 per cent. solution, by means of cotton on the end of a probe. The contraction was sufficient to thoroughly open the nasal canals and thus for hours she could sing with ease and without any nasal intonation. We know of no agent, mineral or vegetable that could be compared in efficiency to the cocaine. Assuming that Dr. Bosworth was correct in his explanation of its action—that when applied to mucous membrane it penetrates its epithelial coat and reaching the coats of the blood vessels produces rigid contraction of their muscular fibres and thereby marked diminution in the calibre of the blood vessels themselves, we can readily understand how the cocaine contracts the blood vessels dilated in inflammation by paralysis of their muscular fibres through the vasso-motor nerves.

We have freely used this salt in rhinitis, acute and chronic, pharyngitis, laryngitis, bronchitis, asthma, etc. When in these diseases the local secretions are excessive cocaine produces a marked diminution of them. For these purposes we have never used a stronger solution than 2 per cent.—taking care to render the solution alkaline by the addition of a few grains to the ounce of sodium chloride. We must bear in mind that the hydrochlorate of cocaine dissolves to 5 per cent. in water, without the addition of acid, which must be avoided because it causes intense burning. It must also be remembered that solutions of cocaine undergo slight changes, and a deposit of fungus takes place. While we are enabled fully to concur with Dr. Major's view that this does not in the least impair its immediate local effect, yet it appears sometimes to produce subse-



quently unpleasant irritation of the mucous membrane. A very small quantity of salicylic, boracic or carbolic acid will prevent the formation of fungus. The addition of two minims of chloroform, a solvent of cocaine, to the ounce, as suggested by Strahan, will effectually prevent the formation of a fungus. Of course the chloroform must be dissolved by agitation in the alkaloidal solution. We have repeatedly used in acute bronchitis and sub-acute laryngitis inhalations by sprays the 2 and 4 per cent. solution of cocaine to control the free secretions and to lessen the inflammatory turgescence, with marked good effects. Perhaps the most pronounced effects of this kind are in acute rhinitis where the topical influence sometimes extends for hours and often aborts the attack.

This property of cocaine—of acting as a powerful astringent, affords great assistance in diagnosing the exact nature of nasal hypertrophies. It unloads the element of turgescence but does not lessen the hyperplasia. The turgescence may lead us astray as to the necessity of operating, for this is only justifiable when there is an amount of hyperplasia sufficient to stop up the nares and interfere with the respiratory or other nasal functions.

*The hæmostatic properties of cocaine* are very pronounced. In a recent extirpation of a tonsil with more obstinate bleeding than we had ever seen before—after trying ice, compression, and tannic acid without effect, we saturated a pellet of cotton with cocaine and pressed it for two minutes upon the bleeding surface, and easily arrested the flow. We have used it in the same way after operating with the cold snare upon the anterior and posterior turbinated bones with unmistakably good results. We have stopped, in a short period of time, bleeding following the removal of adenoid growths from the vault of the pharynx. In one case, a boy of twelve years of age, where the hemorrhage was alarming, tannic and gallic acid, and even Monsell's solution had no effect, but the cocaine acted promptly.

*Anæsthetic Influence.*—Our experience with the use of this agent as a local anæsthetic on throat and nose surfaces fully confirms the favorable reports of Bosworth, Lefferts, Jarvis, Seiler, Jellinek and Major. We are in the habit daily of using it in operations which are in themselves painful and very annoying. Commencing with the anterior nares, we have found a 2 per cent. solution ordinarily strong enough to render painless the application of chromic acid, nitric acid, acetic acid or the Roman paste to turbinated hypertrophies, and also for the use of the galvano-cautery. If the hypertrophies be chronic and

large, and we have to use the cold snare, we employ a 4 or 6 per cent. solution; even then the pain is not entirely removed, but it is deadened. If we resort to Jarvis' needles, in order to get the snare well around the thickened tissue, the solution renders their insertion not perfectly painless, but it lessens materially the sensibility. When the galvano-cautery is employed the sensibility is completely destroyed by the application of the 4 per cent. solution by means of cotton plugs, which are allowed to remain in contact from three to five minutes. We make it a rule to test, by touching with a probe, the amount of sensibility. In removing cartilaginous angles above or on the anterior floor of the nostrils, conditions which interfere so much with the functions of the respiratory tract, by means of the galvano-cautery wire or by the cold snare, we are obliged to make two or three applications of the anæsthetic to annul the pain. In cutting holes and punching through diverted cartilaginous septa by means of the galvano-cautery, we cannot tell the exact amount of sensibility destroyed, for the operation, although disagreeable, is not very painful and is soon over. It is rendered, however, nearly bloodless by the cocaine.

In the surgical treatment of NASAL POLYPI, the cocaine has proved in our hands to be invaluable. Before attempting to remove them by the cold snare, by chromic acid or the galvano-cautery, we apply, by means of a piece of fine sponge, the solution freely around the growths and over the mucous lining on both sides. We next use a fine spray, sent with force by compressed air, up into the nostril. We thus lessen the thickening and are able to locate with greater accuracy the position of the polypi, and we can the more easily get the snare around them. As we tighten the wire we introduce more of the fluid, and render the removal of the growths painless and nearly bloodless. We keep the sensibility of the walls deadened by cocaine to the introduction of the nasal dilators and the removal of all the neoplasms. What a contrast, this, with the operations of a few years ago, which were bloody and extremely painful. The cocaine, we thus conclude, is of inestimable service in the eradication of myxomata and other nasal tumors.

*Naso-Pharynx.*—In the use of the snare to remove the posterior turbinated hypertrophies (a very delicate operation), the anæsthetic assists very materially. One of the most important uses to which we apply the cocaine is by touching the pharyngeal orifices of the Eustachian tube, a very simple operation after illuminating the pos-



terior upper pharyngeal surfaces by means of the rhinoscope, and thus facilitating the catheterization of the Eustachian canal. The rhinoscopic image being in full view, and the mucous membrane becoming thin and insensible, we can inject a feeble solution of cocaine into the tube itself, and thus, by contracting the blood vessels, dilate the diameter of the canal. The inflation by air and the injection of fluids becomes an easy matter.

We have been able to stop the violent pain of *acute otitis* by a few drops of solution of muriate of cocaine. Knapp destroyed for one half hour the sense of smell by applying cocaine to the points of distribution of the olfactory nerves.

*Adenoid Growths.* — Cocaine has simplified wonderfully the removal of adenoid growths in the vault of the pharynx, and the destruction of hypertrophic pharyngeal tonsils. By the introduction of a 4 per cent. solution behind the palate and brushing over thoroughly the surface, we lessen the dolorous sensibility to such an extent that we are enabled to inspect easily with the rhinoscope the vault of the pharynx, the posterior nares and the walls of the naso pharynx.

We thereby keep the sensibility down to such an extent that the patient tolerates not only the reflecting mirror, but the introduction of the instrument for the destruction of the growth, such as Lother's forceps, the curette, or the galvano-cautery. With a 4 per cent. solution applied directly to the growths, their sensibility is destroyed and they are rendered nearly bloodless. We could cite numbers of cases where we have thus relieved patients of this troublesome disease. We have had two cases within a week where the adenoid growths were enormous, and were hanging like grapes above the posterior orifices, shutting up the posterior nares and keeping up an uninterrupted discharge posteriorly. We removed them by means of Cohen's forceps and the galvano-cautery, without pain and with a very slight loss of blood. We, by means of the galvano-cautery wire or the cold snare, have removed several large fibroid growths filling up the posterior nares. Thanks to cocaine, it is an operation performed with ease and without hemorrhage. *Enlarged follicles, thickened bands and varicose vessels* are, with the use of cocaine, effectually and painlessly destroyed by the galvano-cautery.

*Tonsils.*—In the extirpation of the tonsils we cannot state that we have seen much benefit from cocaine as an anæsthetic. The operation is not very painful, and it is so rapidly done that it is difficult to



form a correct opinion of the effect of cocaine. After the operation the soreness and the bleeding are both controlled very favorably by this agent.

We have had no papillomata or other growths to remove from the larynx since the discovery of Koller, but Elsberg reported that he had found a 4 per cent. solution in the larynx deadened the dolorous sensibility, but to annul the tactile sensibility, a stronger solution, even to a 25 per cent., was necessary. He removed a papilloma from the anterior commissure, previously exceedingly irritable, and the patient averred positively that he did not feel the forceps at all.

Recently we applied a 4 per cent. solution by means of a spray upon the vocal chords of an opera singer, where from overuse they were relaxed, and consequently the lower notes of her voice were deficient in force and clearness. The effect was very marked. The salt acted as a voice tonic.

In two cases of *severe reflex spasmodic asthma*, resulting from nasal diseases, we used cocaine, applied with a brush to the nasal surfaces, with very decided relief, lasting several hours.

*Laryngeal phthisis*.—Before concluding we must not fail to report to the Faculty the wonderfully beneficial influence of cocaine in relieving the dysphagia of laryngeal phthisis. So great often is the pain of deglutition in these cases that many patients have died from inanition, being unable to swallow sufficient food to keep them alive.

For ten years the writer has been in the habit of introducing fluid food into the stomachs of such persons (by means of small œsophageal tubes attached to a fountain syringe) in order to keep them alive. In October last he had such a case under his care where four times in the twenty-four hours she was artificially fed with milk, and the dysphagia was very painful to witness. As soon as he received the cocaine he tested its anæsthetic virtues by applying it freely to the ulcerated surfaces of the epiglottis and of the larynx. The effect was magical, the patient swallowing milk with but little inconvenience. The patient lived nearly two months, and it was not necessary again to employ the artificial feeding. Since that time, he has used the cocaine of the strength of from 4 to 10 per cent. in this manner repeatedly in a number of cases and always with great benefit. The discovery of cocaine has been a great blessing to subjects of laryngeal phthisis and of syphilitic pharyngeal ulcerations.

Have we not a right to conclude, Mr. President, from a large ex-

perience in its use, that cocaine is a very valuable agent in nose and throat surgery?\*

\* Since the reading of this Report, Dr. Mactier Warfield, of Baltimore, observed (Medical News, May 30, 1885) that while the sensibility of the cornea and conjunctiva was abolished by cocaine, the impact of the instruments was felt as a distinctly cold sensation. Subsequently, Mr. H. H. Donaldson experimented upon the eye, and Dr. J. N. Mackenzie upon the oro-pharyngeal cavities and nasal passages with results confirmatory of Dr. Warfield's observation. These observations are of great interest in their bearing upon the physiological question of the separation of the varieties of sensation. A comparatively weak solution (4 per cent.) was used in these experiments. The late Dr. Elsberg (quoted by Dr. Bosworth) noticed that the application of a 4 per cent. solution in the larynx dulled in most persons the dolorous sensibility but that the annulling of the tactile sensibility by which temperature and pressure are appreciated, required a stronger solution and also that reflex sensibility demanded a still stronger solution. He found that a 25 per cent. solution was necessary. The writer has frequently observed in producing local anæsthesia by ether, by rhigolene, as well as by cocaine, that, although the dolorous sensibility was overcome, there remained some tactile sensibility.

These contradictory experimental results must be further investigated before it can be positively concluded whether cocaine can annul all varieties of sensibility.





